



# Parcel E-2 Landfill Gas Monitoring

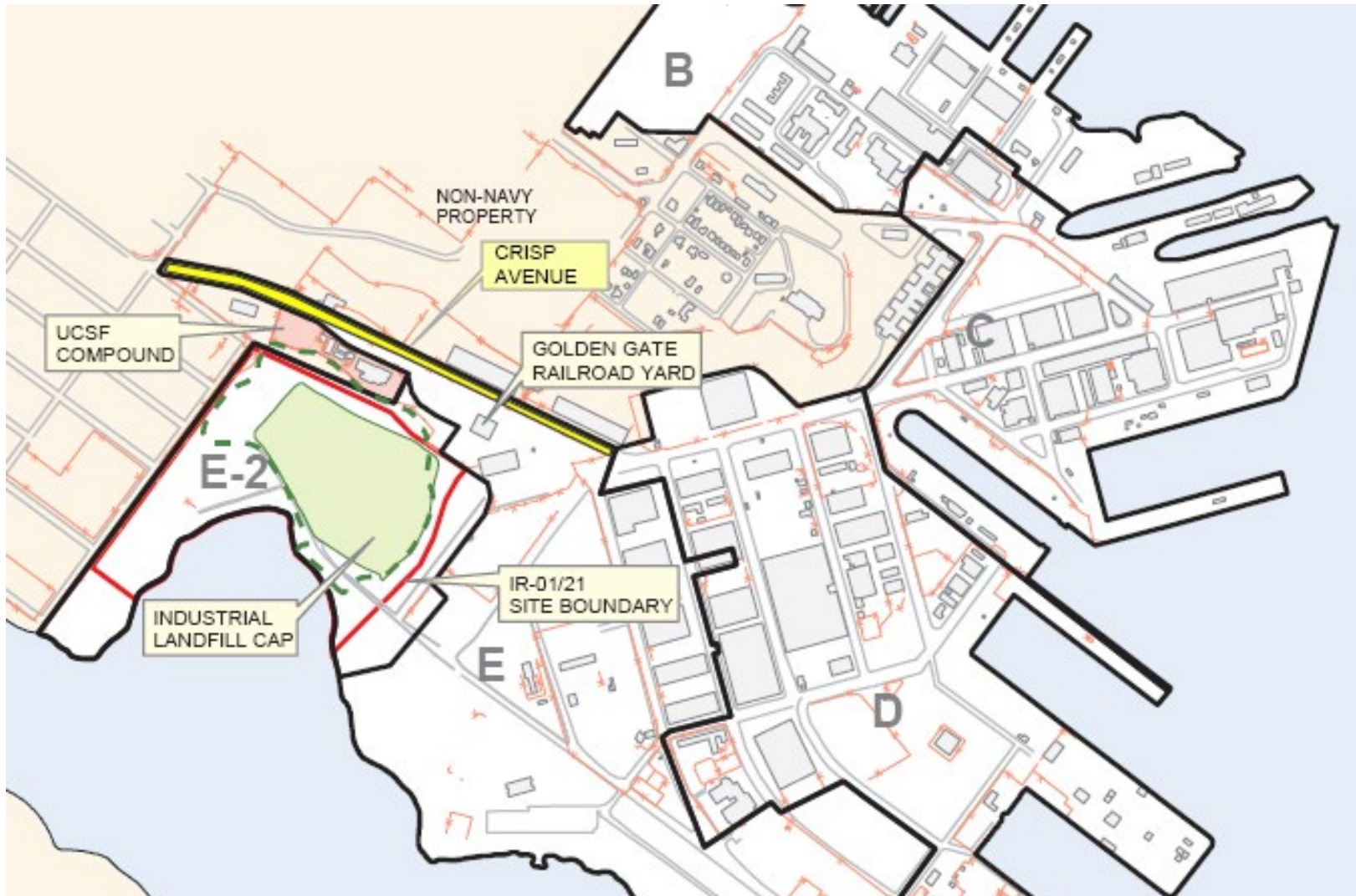


## Parcel E-2 Landfill Gas Monitoring – Crisp Ave Gas Probes

Hunters Point Shipyard  
April 26, 2011



# Parcel E-2 Landfill Location





# Parcel E-2 Landfill Gas Program Summary



- Objectives of landfill gas monitoring:
  - Verify that landfill gas control system is effectively reducing levels of methane and NMOCs (non-methane organic compounds) to below regulatory limits
  - Prevent hazardous levels of landfill gas from migrating to the UCSF compound and non-Navy property
  - Regulatory limit for methane in gas monitoring probes (GMPs) is the lower explosive limit of 5% by volume, as set by 27 CCR §20921(a)(2)
  - Oversight performed by the California Integrated Waste Management Board (CIWMB)
- Parcel E-2 landfill gas monitored on Crisp Avenue:
  - Methane has never been detected in any Crisp Avenue GMP by field instruments
  - Methane was detected at 18 parts per million (0.0018% by volume) in Summa canister sample collected at GMP15 in December 2004



# Parcel E-2 Crisp Ave Gas Probes - History



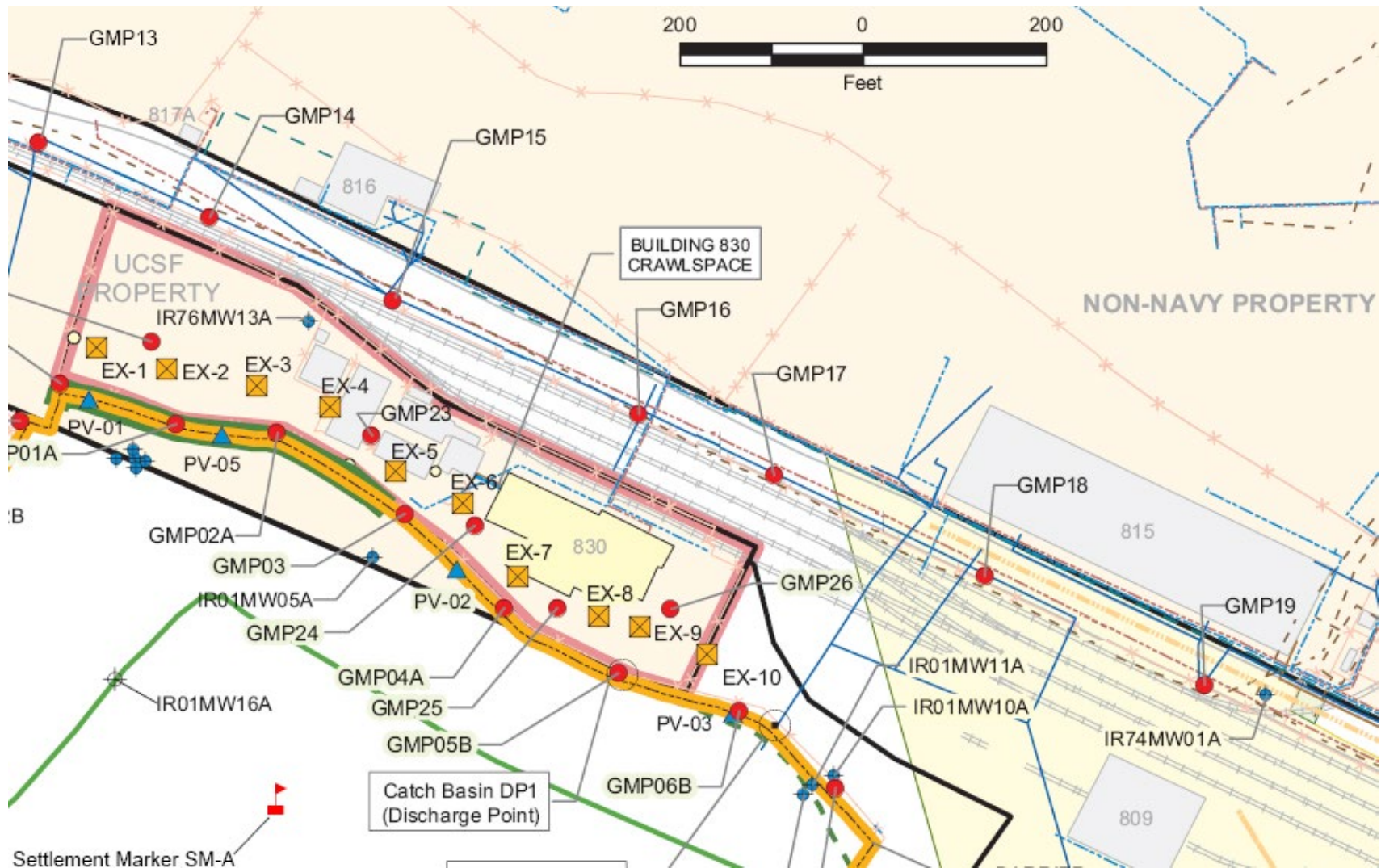
- **May 2002 - Seven GMPs (GMP13 through GMP19, 5-19' depth) were installed to investigate the possible extent of landfill gas migration toward Crisp Avenue. The locations of these GMPs were based on:**
  - A review of the existing utility drawings for any preferential pathways
  - The results of a soil-gas survey conducted in April 2002
- **February 2004 - Six new GMPs (GMP27 through GMP32, 15½-23' depth) were installed between existing GMPs along Crisp Avenue to address CIWMB's concern that some of the existing GMPs did not extend to the lowest historical groundwater elevation.**
  - Potential existed for space between groundwater and the bottom of existing GMPs for a portion of some dryer years
  - Methane could possibly migrate in the space under the GMP and remain undetected
  - Larger 2" probe casing utilized instead of previously-installed ¾" diameter casing





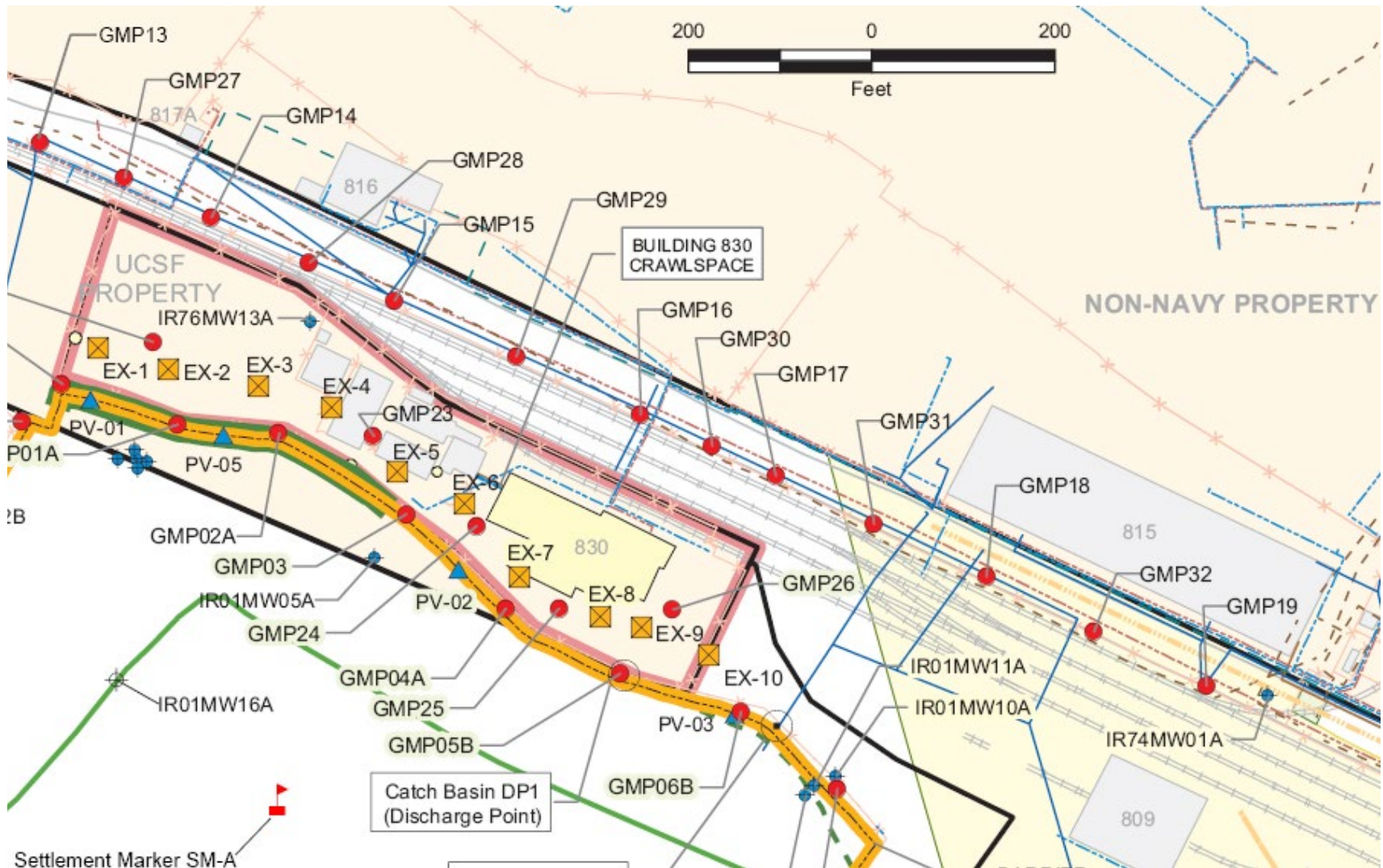
# Parcel E-2 Landfill Gas Program

## Original (May 2002) GMP Locations





# Parcel E-2 Landfill Gas Program Additional (February 2004) GMP Locations







# Parcel E-2 Crisp Ave Gas Probes - History

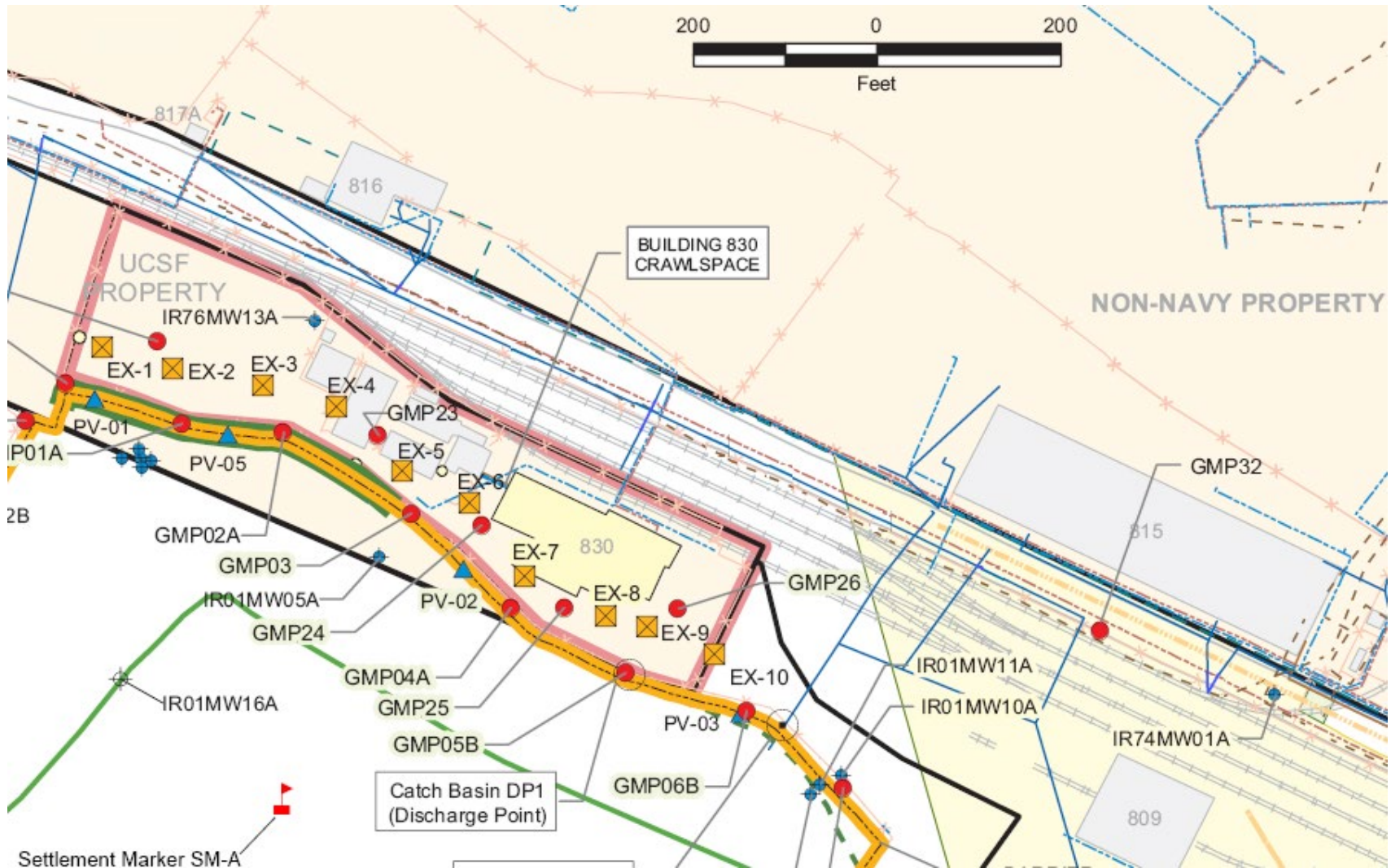


- **August 2010 – Tetra-Tech removed Crisp Avenue GMPs during sewer line removal activities**
  - All GMPs on Crisp Ave removed except GMP32
  - Final completion grading in April 2011
- **May 2011 – Reinstallation of Crisp Ave GMPs**
  - Probes will be installed per the Master Control Plan, TtECI, 2004
  - Title 27 CCR calls for maximum GMP spacing of 1,000 feet
  - Original GMP placement had maximum GMP spacing of 300 feet
- **Navy proposes installation of seven new GMPs on Crisp Ave, located around GMP32**
  - Maximum spacing of 200 feet
  - Deeper probe construction, as used in GMP27 through GMP32 (at least 15½-23' depth, or to historic low water level)
  - 2" probe diameter to allow collection of water level data



# Parcel E-2 Landfill Gas Program

## Current Crisp Ave GMP Locations









# Title 27 CCR Requirements

## Gas Monitoring Probe Perimeter Network



Title 27 CCR Requirement	Summary
Location (27 CCR §20925[a])	GMPs should be installed around the waste perimeter, but not within the waste. The entire perimeter of the landfill shall be monitored unless adequate reason can be established that it is not necessary. The perimeter monitoring wells should be located at or near the facility property boundary but may be established closer based on the site factors.
Spacing (27 CCR §20925[b])	Lateral spacing between wells shall not exceed 1,000 feet. Other factors affecting the lateral spacing include the nature of the structure to be protected and its proximity to the waste, the geology adjacent to the waste, off-site, and on-site structures, and areas of dead or stressed vegetation that might be due to gas migration. The spacing shall be reduced as necessary to protect persons and structures threatened by landfill gas.
Depth (27 CCR §20925[c])	The depth of the well borehole shall be equal to the maximum depth of waste as measured within 1,000 feet of the monitoring point. Within the well borehole, a shallow probe shall be installed 5 to 10 feet bgs, an intermediate probe shall be installed near half the depth of the waste, and a deep probe shall be installed near the depth of the waste. The depths shall be adjusted based on the site geology, and the probes should be placed adjacent to the soils most conducive to gas flow. Probes shall be installed above the permanent low seasonal water table. If the depth of the waste does not exceed 30 feet, then the number of probes may be reduced. Alternate depths may be proposed if the site does not warrant the installation depth criteria above.
GMP Construction (27 CCR §20925[d])	Monitoring wells shall be drilled by a licensed drilling contractor under the supervision of the design engineer. During drilling, wells shall be logged by a geologist using standard visual classification methods. Records for each monitoring well will be maintained and submitted upon request.
Structural Monitoring (27 CCR §20931)	The monitoring network design shall include monitoring of on-site structures, including buildings and utility vaults. Methods for on-site structural monitoring may include periodic monitoring utilizing either permanently installed monitoring probes or gas surveys or continuous monitoring systems.
Monitoring Parameters (27 CCR §20932)	All monitoring probes and on-site structures shall be monitored for methane and trace NMOC if required.
Monitoring Frequency (27 CCR §20933)	At a minimum, quarterly monitoring is required. More frequent monitoring may be required at those locations where results of monitoring indicate that landfill gas migration is occurring or is accumulating in structures.
Reporting (27 CCR §20934)	Results of landfill gas monitoring shall be submitted within 90 days provided that compliance levels are maintained. When compliance levels are exceeded, the results must be submitted within 5 days. A letter describing the nature and extent of the problem and any immediate corrective actions that need to be taken to protect public health and safety and the environment must be submitted within 10 days.